*United States Navy*

# DVECC Bulletin

*Serving the Military Pest Management Community*

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# *Feature Articles*

***Natural Pyrethrum***
***Deet***

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# *Natural Pyrethrum – Notes on the State of the Industry*

Pyrethrum is a mixture of six chemicals produced in the flower heads of daisy-like flowers in the genus *Tanacetum*. The flowers were once classified along with chrysanthemums, and *Pyrethrum* was used for many years as the genus name for many of the flowers we now consider to be *Chrysanthemum*. *Tanacetum cinerariaefolium*, the plant that dominates the modern market, is native to the Balkan region of Europe. Before the discovery of the strong biological activity of *T. cinerariaefolium* in 1840, it was *T. coccineum*, from Northern Persia (Iran) and the Caucasus, that dominated the market. A third species, *T. marshalli*, may also be marketed as "pyrethrum." [Note that these plants have all been known by different names over the years, and any serious search for information concerning them should begin with a search for their taxonomic synonyms.]

There is a large world market for pyrethrum, and most of the material in international trade is produced in East Africa, particularly Kenya. Tanzania and Rwanda also export pyrethrum, as does Ecuador (South America) and Australia, but not like the volume produced in Kenya. Many other nations produce pyrethrum for their own use. The East African highlands are ideal for growing pyrethrum daisies, because the soil is rich with good drainage and the highlands offer the right combination of sun, rain, and cool weather. The areas in Kenya producing the highest-quality pyrethrum (Nakuru, Laikipia, Kisii, Kiambu and Bomet divisions) are at 1,800 m or greater elevation and have reliable rainfall. Elsewhere in Kenya (Githunguri and Limuru divisions, for example) the soil requires liming, and the quality of the crop is less.

In Kenya, some 90,000 individual growers, cooperatives, and larger owners plant and harvest the plants locally and independently. In some areas, the average plot is 1.5 hectares (3-4 acres). The process is labor intensive and, until very recently, largely unregulated. Production volume can vary widely from year to year. There was a worldwide shortage of pyrethrum in 2001, for example, due to crop failures in Kenya. Competing crops, weather and other local factors all affect the volume available for the market in any given year. The Kenyan industry relies on cheap, local labor for planting, weeding and harvesting. Plants are started from "splits," or divisions of existing plants. These are planted once to establish their root system, then transplanted to their permanent sites – all by hand. Flowers are harvested from any given plant every other week by hand, and the harvest period extends for seven to ten months. The flower heads are dried locally and shipped in bags to a regional processing point. There, the flower heads are crushed into powder and then converted to a liquid concentrate for formulators on the world market.

After several false starts in New South Wales and Tasmania in the middle of the 20$^{th}$ Century, Australia is developing a pyrethrum industry which has settled in northwestern Tasmania. The success of the present industry there resulted from the development of a high-yielding, synchronous-flowering *Tanacetum* clone and the means to harvest the crop

mechanically. At least one current producer, Botanical Resources Australia (BRA), is sowing seed instead of transplants and has mechanized almost the entire production operation. Until about 1990, Tasmania exported the processed crop in the form of a tarry oleoresin to the U.S. for final refining, but they now have an operating refinery of their own. The Tasmanian state government, the University of Tasmania, and many potential commercial interests have supported the research and development necessary to establish this industry.

Despite the money and energy going into the Australian pyrethrum industry, it still serves more to offset production variations in Kenya, which still dominates the market. In the words of Ian Folder, managing director of BRA, his company plans "to be the stabilizer in the market." Folder estimates that by this year his organization will be providing 40% of the pyrethrum exported to the world market, but that remains to be seen. Eighty percent of his production currently goes to the U.S., with the remainder divided among, mostly, European nations.

Australian New Crops Newsletter No. 2, Jul 1994, "Pyrethrum (*Tanacetum cinerariaefolium*)"
BRA Pylines, Aug 2001 (www.botanicalra.com.au/Pylines_8_2001.pdf)
Kenyaweb.com
Pest Control, Jan 2002, vol. 70, no. 1, pp. 32-34, "There's Gold at the End of the Pyrethrum Rainbow"
Pest Control, Mar 2002, vol. 70, no. 3, p. 6, "Facts on Kenya Pyrethrum" (letter)
Pest Control, Jun 2002, vol. 70, no. 6. pp. 6-7, "Pyrethrum Letter Hits Home" (letter)
Workshop on "Industrial Utilization of Pyrethrum," Dar-el-Salaam, Tanzania, 29-31 May 2000

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# *DEET Shown Most Effective in Repelling Mosquitoes.*

*[LCDR G. B. Schoeler, MSC, USN, DVECC Bangor]*

Protection against arthropod vectors of infectious diseases and arthropod pests is vitally important for military personnel in an operational setting. Historically, in every war and military conflict, combat power has been reduced significantly more by disease and non-battle injuries (DNBI) than from combat casualties. A number of diseases that may affect the health of deployed personnel are directly attributed to disease-carrying arthropods. These include malaria, dengue and other debilitating arthropod-borne diseases. Aside from disease transmission, arthropods can inflict physical, psychological, and economic stresses that threaten the military mission.

Arthropod repellents are the first line of defense against arthropod-borne diseases for military personnel. In many tactical situations, e.g., assault, bivouac, entrenchment, and personnel movement, vector or pest control measures cannot be instituted or may not be sufficient to prevent disease transmission or bites from nuisance pests. Aside from a few approved vaccines and prophylactic drugs, personal protective measures, including the correct use of repellents, represent the primary means of preventing vector-borne disease among personnel in a field setting. Repellents also provide the Commanding Officer with a quick and inexpensive method to protect the force in any military situation, no matter how quickly the unit is called into action.

Protection from arthropod bites is best achieved by avoiding infested areas, proper wear of field uniforms, and the correct use of effective arthropod repellents. Arthropod repellents containing N,N-diethyl-3-methylbenzamide, or “deet,” are the familiar and effective arthropod repellents available. However, personnel are often reluctant to apply deet-based products because of perceived safety concerns or simply because of the smell or feel when applied to the skin. For this reason, personnel often purchase and use non-deet-based repellent products hoping that they prove effective in preventing arthropod bites. Some commonly-used compounds that are thought to be effective include citronella, certain bath oil and cosmetic products, and herbal and botanical compounds.

In a recent study published in the New England Journal of Medicine (Vol. 347, No.1, July 2002), Mark S. Fradin, M.D., and John F. Day, Ph.D., compared the efficacy of 16 nationally-available insect repellent products. Products evaluated included seven widely-available botanical repellents, and four commercially-available deet-based repellents having deet concentrations ranging from 4.75 to 23.8%. Three repellent “wristbands” impregnated with deet or citronella, and a cosmetic product thought to have effective repellent properties were also evaluated. In the study, 15 volunteers randomly used one of the repellent formulations or products and inserted their arms into cages containing unfed female *Aedes aegypti* mosquitoes, and the elapsed time until the first bite was then recorded. Results demonstrated that deet-based

products provided the most effective protection for the longest amount of time when compared to formulations that do not contain deet. The formulation containing the highest concentration of deet (23.7%) provided the longest complete protection (just over 5 hours). In contrast, the longest protection provided by any of the non-deet products was only 1.5 hours. The compound containing soybean oil provided protection similar to that of the lowest concentration (4.75%) of deet (94.6 minutes vs. 88.4 minutes). None of the other botanical formulations provided protection for longer than 22 minutes.

The conclusions of this study support what has been known for many years concerning deet-based arthropod repellents. Specifically, commercially-available repellents that do not contain deet do not provide protection from insect bites for as long as deet-based repellents. These non-deet-based repellents cannot be relied upon to provide prolonged protection in areas where mosquito-borne diseases are a threat, and they may actually be dangerous to personnel who mistakenly believe that they are protected from arthropod bites and vector-borne disease.

The results of the study also showed a positive correlation between the concentration of deet in a formulation and the length of protection provided. Specifically, higher concentrations of deet provided longer-lasting protection, but the duration of protection tended to plateau at deet concentrations approaching 50%. Simply stated, concentrations between 30 and 50% have been shown to provide the most effective, long-lasting protection against arthropod bites. Formulations containing concentrations above 50% deet do not provide greater protection and are not recommended for use. In fact, formulations containing greater than 50% deet may cause skin irritation under certain conditions.

Since deet was first developed, U.S. military forces have used deet-based formulations as their standard arthropod skin repellent. Deet is effective against a wide variety of arthropod species, including mosquitoes, other biting flies, fleas, ticks, and chiggers. Several deet formulations are available through the military supply system. The extended-duration formulation (*Two-Ounce Tube, NSN 6840-01-284-398*) is the standard, recommended military skin repellent because it is superior to other formulations that may be available. This has been the repellent of choice by the US military since 1990, when it first became available in the military supply system. The product contains 33% deet in a controlled-release base, and is a non-greasy, white lotion with a mild, pleasant odor. This formulation slows the absorption and evaporation of deet, thereby holding it on the surface of the skin where it can continue to repel arthropods for an extended period of time. Laboratory testing shows that the extended-duration deet lotion provides 6 hours of at least 95-percent protection against a variety of mosquito species in a tropical environment, 10 hours in a hot, dry environment, and 12 hours in a forested/wet environment.

When applying deet, it is very important to follow label directions. Dispense the lotion into one hand, rub the hands lightly together, and apply thoroughly in a thin layer over the forearms, upper arms, face, neck, ears, and other exposed areas. Do not apply repellent to the eyes and lips, or to sensitive or damaged skin. Do not waste deet by applying it thickly; a light, uniform coating provides excellent repellent protection. Again, repellent formulations containing higher concentrations of deet do not provide longer, or better, repellency. The extended-duration deet formulation can be safely used with camouflage face paint; apply a thin layer of deet first, followed by the face paint. If the tactical situation permits, wash off deet repellent after the potential exposure to arthropods has ceased. Although deet is not soluble in water, it quickly washes off skin and out of clothing with soap and water. In addition, deet is a plasticizer and must be used with care to prevent damage to plastics, rubber, vinyl, or elastic items such as eyeglass frames, plastic lenses, and cases; contact lenses; combs; watch crystals; goggles; painted and varnished surfaces; and some synthetic fabrics (except nylon). The water-repellent properties of Gore-Tex® are also reduced by deet. Deet does not damage cotton or wool fabrics.

To provide maximum protection against biting arthropods, deet skin repellent should be used with other available methods of personal protection. This includes proper wear of the field uniform to minimize skin exposure. In areas heavily infested with flying pests, a head net (NSN 8415-00-935-3130) can be used over the cap or helmet. Indoor protection can be greatly enhanced by using mosquito bed nets (NSN 7210-00-266-9736) and tent screens. To maximize protection, field uniforms, bed nets, and tents can be sprayed with permethrin, which is the most recent addition to the arsenal of personal protective repellents, and is the most effective clothing impregnant available. Permethrin acts as a contact insecticide against crawling and flying arthropods. It is odorless, nonirritating, and resistant to washing and abrasion (rubbing off). When applied correctly, permethrin is bound so strongly to most fabrics that detergent and water will not remove it. A significant level of permethrin remains in a treated uniform through multiple launderings. Several formulations of permethrin are available through the military stock system. For detailed instructions concerning permethrin application, as well as other methods of personal protection against biting arthropods, refer to the Armed Forces Pest Management Board (AFPMB) Technical Information Memorandum No. 36 “Personal Protective Techniques Against Insects and Other Arthropods of Military Significance”, available on the AFPMB website, www.afpmb.org.

In summary, the simultaneous use of arthropod skin repellents containing 30-50% deet, proper use of the field uniform, and application of permethrin to clothing, provides maximum personal protection against disease-causing and nuisance arthropods. Although not all arthropod species are equally repelled by a particular repellent, repellent formulations containing DEET are still the most effective repellents available. Keep in mind that some biting arthropod species are active during the day; others only at night. For this reason, it is important to follow recommendations provided by Commanding Officers and medical personnel, which may indicate the necessity of using repellents around the clock.

Remember that lack of bites during the day does not prevent the threat of bites at night. Commanding Officers and medical personnel must monitor compliance with personal protective strategies to ensure that all appropriate protective resources are being provided, and that individuals are using these protective resources properly.

Repellents and pesticides can be acquired rapidly by calling the Emergency Supply Operations Center (ESOC) at the Defense Supply Center of Richmond (DSCR), 8000 Jefferson Davis Highway, Richmond, VA 23297-5000, at DSN 695-4865; commercial (804) 279-4865. The Center provides emergency supply needs 24 hours a day, 7 days a week.

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# *Items of Interest*

## *For the Technician*



## *For the Entomologist*



## *Of General Interest*



## *Regulatory Items*



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## *New "molecular clock" suggests date for origins of insects*

*[From an "Editor's Choice" article in SCIENCE, vol. 296, 7 Jun 2002, reviewing Gaunt and Miles, Mol. Biol. Evol. 19:748, 2002]*

In phylogenetic studies, the molecular clock hypothesis has become the basis for figuring the dates at which evolutionary lineages of organisms diverged. The number of nucleotide substitutions along the length of a branch of a phylogenetic tree is a surrogate for the age of the branch. Because of variation in substitution rates, however, reliable molecular clocks are sometimes hard to identify.

Using GenBank sequence data, researchers have now been able to define a robust molecular clock for the insects – the most diverse of animal groups – that identifies the deepest nodes in the phylogenetic tree and is in accord with the fossil record. According to this clock, the earliest insects cleaved from their nearest relatives, the fairy shrimps, about 430 million years ago, close to the emergence of the first land plants.

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## *Cholera Pathogen Gains Strength by Passing Through Gut*

*[Elizabeth Pennisi, "News of the Week," SCIENCE vol. 296, 7 Jun 2002, pp. 1783-84. Original work reported by A. Camilli et al. in NATURE, 6 Jun 2002]*

Microbiologists have discovered that the human gut seems to prime the bacteria responsible for cholera. Before *Vibrio cholerae* exit the body in watery stools, something about the intestinal environment causes them to rev up the activity of certain genes. These genes, in turn, seem to prepare them for more effective colonization of their next victims, possibly fueling epidemics.

While studying a cholera outbreak in Bangladesh, a graduate student noticed that *Vibrios* isolated from human stools vastly out-competed *Vibrios* from local lab colonies when injected into mice. The former were up to 700 times more infective than the latter.

The increased infectivity is temporary. It lasts up to five hours in pond water – long enough for someone to drink the water. The hyperinfectivity disappeared when the *Vibrios* were grown in lab culture for 18 hours.

The hyper-infective pathogens are altered by the gut in the expression of certain genes that normally direct the motions of unaffected bacteria. For unknown reasons, unaffected cholera pathogens seek to colonize certain regions of the lower intestine, using chemical cues to locate these sites. The genes governing this mechanism appear to be silenced by passage through the human gut, resulting in pathogens that will, temporarily, colonize any part of the gut.

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## *Usutu virus may be established in European mosquito populations*

*[From an "Editor's Choice" article in SCIENCE, vol. 296, 7 Jun 2002, reviewing an article in Emerging Infectious Disease]*

Usutu virus is a mosquito-borne pathogen of African birds, occasionally infecting humans and other mammals, and is related to flaviviruses such as the West Nile and yellow fever viruses.

During August and September 2001, migrant and resident birds in Austria died, and researchers were able to detect Usutu virus in the corpses of blackbirds, swallows, and captive owls. Because of the scale of bird deaths observed, it appears that Usutu virus in migrant birds has become established in a European mosquito species and is managing to overwinter in Europe. This is the first observation of Usutu virus outside Africa and may presage the advent of more broadly pathogenic tropical viruses into Europe.

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## *Ecdysozoa?*

*[Editor's choice article, "Humans, Flies, and Worms," SCIENCE vol 296, 14 June 02, p. 1931, reviewing BMC Evol. Biol. Vol. 2, no. 7, 2002]*

The evolutionary relationships of nematode worms to other animal groups have remained controversial. Earlier analyses based on morphology and developmental patterns placed nematodes at a distance from animal groups with true body cavities (coeloms), but more recent analyses of ribosomal gene sequences instead implied closer links to arthropods – a coelomate group – and led to the proposal of a superphylum of molting animals, the Ecdysozoa. Now a research group has compared sequences of more than 100 nuclear proteins, and their analyses support the traditional model of nematode phylogenetic relationships, placing arthropods closer to vertebrates than to nematodes, and nematodes distant from both.

For a good discussion on the pros and cons of establishing the taxon Ecdysozoa based on the information available prior to this study, click here

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## *Western Drywood Termites Tunnel in Plastic*

*[Pest Control Magazine, vol 70, no. 6, Jun 2002, p. 48, by Hanif Gulmahamad]*

Western Drywood Termites (WDTs) often account for 70% or more of termite revenues for local pest management firms in Southern California. They are the most common and destructive drywood termite in the western U.S., infesting sound, dry wood and a wide variety of cellulose-based products. Unlike the common subterranean termites of the eastern U.S., WDT infestations usually go unnoticed for years, since they produce no tubes of other easily-seen signs of infestation. Like other drywoods, they do produce tiny "kick holes" in the surface of the infested wood, out of which they expel frass pellets and other debris from their colony. Homeowners generally don't notice these signs unless the kick holes or debris are in very obvious locations. After four years or so, WDTs will begin producing winged forms (alates), which swarm from the colony in large numbers, revealing the presence of an infestation. For a good discussion of termite castes and reproductive behavior, click here; for information on the WDT, click here.

In October 2001, a Terminix representative in Los Angeles, California discovered WDTs infesting a computer power adapter that was lying on the carpet. The adapter was in use, powering a Apple Powerbook® laptop computer, and termites had tunneled about two inches into the adapter cord and the adapter itself. At the distal end of the small gallery, a kick hole had been opened, and both frass and plastic debris were collected outside the kick hole. Several live termites were seen in the gallery, which was warmer than ambient temperature due, probably, to normal resistance to the current passing through the wires in the adapter cord and the adapter itself. The floor below the carpet was infested underneath the cord, and is the presumed source of the infestation.

There doesn't seem to be any other record of the WDT tunneling in non-cellulose materials, but we shouldn't be surprised – they don't read the same textbooks we do.

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## *Sociogenomics*

*[Adapted from SCIENCE, vol 297, 12 Jul 2002, p. 204, "Sociogenomics Takes Flight," by Gene E. Robinson]*

Sociogenomics is the application of genomic materials and methods to the study of social animals. It answers the main question "how does gene expression influence sociality in animals?" Sociogenomics, a newly-emerging field, is predicated on two significant ideas that emerged from biology in the late 20th Century: First, that many aspects of social life, including social behavior, have a biological basis and are thus influenced to some extent by genes and the forces of evolution. Second, that the functions of many genes are highly conserved between invertebrates and vertebrates even for complex traits.

Some recent work has shown how the same genes create, in ants, both winged and wingless forms. Based on taxonomic and fossil evidence, it is generally accepted that winglessness in worker ants is something that evolved only once. There are no ant species that produce winged workers. The genes for creating wings during insect development had been identified in *Drosophila*, and researchers working with ants investigated how the stream of gene expression was altered in ants to produce wingless adults. (The very active field of study that examines the role of development processes in evolution has been labeled "evo-devo.") To nobody's surprise, the same genes (as in *Drosophila*) were expressed in the same order to create the winged queens and males in the ant species studied. The results for wingless workers, however, provided some surprises. Imagine a sequence of several genes that must be expressed in a certain order to develop wings. If winglessness developed only once in ants, the expected result would be to find that one of those genes was not expressed, thus shutting off the wing-making process. And, one would expect it to be the same gene in all ants. As it turns out, different ant species accomplish the same thing differently. Some shut off the first ("upstream") gene, some shut off the last, and others are somewhere in the middle – and this was in a sample of only four ant species. Not only were there species-specific differences, but, in the case of *Pheidole morrisi*, the soldiers achieved winglessness via a different break in the gene expression sequence than did the workers.

This highlights the importance of comparative genomics and a pitfall of using the gene expression pattern of one species to predict the pattern in another, even if they are very closely related. While the function of many genes may be highly conserved, the way in which they are expressed to achieve a particular phenotype may vary tremendously.

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## *Active Poliovirus Created from Scratch in the Laboratory*

*[Adapted from SCIENCE, vol 297, 12 Jul 2002, p. 174, "Active Poliovirus Baked from Scratch," by Jennifer Couzin]*

Researchers have created living poliovirus from genetic building blocks ("bases") available on the open market. In fact, to create the final two-thirds of the genetic instructions, they farmed the work out to a commercial DNA-synthesizing firm. Polio has a very small amount of genetic material in the form of a single strand of RNA having about 7700 bases. (Smallpox, by comparison, has about 185,000 bases.) Polio RNA is very unstable, so the researchers first made a mirror-image DNA strand. They got the "recipe" for the order of the bases from a public source, probably off the internet. It took them about two years to assemble the first third of the DNA strand. Once they had mastered the technique, they contracted the remaining two thirds to a commercial firm. They purposely made 19 "mistakes" along the length of the DNA strand to distinguish their product from natural poliovirus. They put the mistakes in places where they felt no drastic change would occur to the completed virus.

Once all 7700 bases were assembled into single DNA strands having the proper "folding," the researchers used the DNA to make the actual poliovirus RNA. For these small viruses, the gene IS the virus, so they had created the poliovirus. And it behaved like polio – it reproduced itself in cell cultures, polio antibodies blocked its entry into cells, and it caused lethal polio in rodents. It took 1,000 to 10,000 times the number of wild poliovirus to cause disease, but the researchers attribute that to the mistakes they introduced into the genes.

This is an interesting turn of events, since the World Health Organization has a Global Polio Eradication Initiative underway, and Europe was just declared polio free. What does that mean if researchers can make the virus from scratch in a lab? The sequence of bases for other pathogens is public information, posted on the internet. What's to stop terrorists, psychopaths, or simply the curious to translate that information into disease? These are difficult questions with no real answers. It's tempting to say that new pathogen sequences should not be posted, or that research like this, that is, creating pathogens from scratch, should not be allowed. Maybe so, but nobody is stopping the bioterrorist, and maybe it's good to know what CAN be done. We'll undoubtedly hear more about this in the future.

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## *Transgenic Mosquitoes and Malaria Control*

*[Adapted from SCIENCE, vol 297, 05 Jul 2002, p. 30, "Ecologists See Flaws in Transgenic Mosquitoes," by Martin Enserink]*

There is a plan afoot to modify the genetics of mosquitoes so they are unable to transmit malaria to humans. If possible, this would be a tremendous accomplishment, but there are those who think the program faces enough difficulties to make it a practical impossibility. Each human malaria pathogen requires two hosts to complete its life cycle – a mosquito and a human. The strategy of the geneticists is to insert or disable mosquito genes with the goal of developing a strain of mosquitoes that is resistant to the pathogen. With the pathogen unable to survive in the mosquito, the chain of infection would be broken. In fact, there is now a laboratory colony of these transgenic mosquitoes that can no longer transmit mouse malaria to mice. Once such a strain is developed for the human malarias, massive numbers would be released in malaria-endemic areas, where they would spread the new gene throughout the endemic mosquito population, thus reducing the vector potential of that mosquito species in that area.

It's with this last part of the proposal that ecologists see problems. Some of the questions raised by ecologists at a recent meeting in the Netherlands were 1) Will the lab-reared mosquitoes be able to compete successfully for mates in the wild? 2) How long will it take the new gene to establish itself at effective levels in the population? 3) Would the gene be 100% effective in mosquitoes that carry it? 4) In areas with more than one species of malaria vector, would all the species need to be "treated?" 5) Would the malaria pathogens develop resistance to the new genes? 6) Is there an emergency plan in case the modified mosquitoes produce an unanticipated and undesirable effect? 7) Where and how would pilot studies be conducted? 8) Who would set the rules for such trials? (Answer: WHO would probably set the rules – we couldn't resist that one) 9) Is it ethical to subject a human population to a study to which each individual had not agreed to participate?

The lab scientists who are doing the genetic work have acknowledged that they had not considered many of these questions, and perhaps by being represented at the ecology conference at this point in the program, they show positive signs of welcoming the input of the ecologists. None of the questions raised seems to be a show-stopping issue, and all have been addressed successfully in other programs, so, with five or more groups funded for research in this area, it's likely we'll see further developments in this novel disease-control strategy.

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## *Bayer-Aventis Merger Leaves Fipronil Adrift*

*[Adapted from Pest Control Technology, vol. 30, no. 7, July 2002, pp. 24-30, "Split Decision," by Dan Moreland]*

After earlier approval in April 2002 by the European Union Commission, the U.S. Federal Trade Commission (FTC) gave its approval on 30 May to the proposed acquisition of Aventis CropScience by Bayer AG. Among the conditions of FTC's approval were that the new corporate entity sell off all fipronil-based products, intellectual property rights associated with fipronil, and the Aventis-owned fipronil production facility in Elbeuf, France. Fipronil is a popular new active ingredient found in Termidor® (a termiticide with annual sales of $75 million), Chipco TopChoice® and Firestart® (for fire ant control), Frontline® (the product that took flea control out of the hands of pesticide applicators and placed it in the hands of veterinarians), MaxForce® cockroach bait stations, and other pesticide products. By the terms of the agreement, the divestiture had to be completed by the end of November 2002. By mid-summer there were no formal offers (possibly because any corporation with the means to make the purchase would likely face the same FTC antitrust scrutiny as Bayer/Aventis), but several bidders eventually appeared, and BASF, for $1.8 billion, will now own fipronil and the French manufacturing plant. Bayer/Aventis has reserved the right to buy back licensing for fipronil for non-agricultural use in various specialty markets. Bayer/Aventis will pay BASF for the right to produce and market these products, which will vary from country to country.

As an interim measure, Bayer has created a "Hold Separate Manager – Fipronil ES." This managerial position will function independently of Bayer, answering instead to a third-party "trustee" group established to oversee the transferal of the fipronil rights to BASF. The position, held by Bayer's former Termidor® product manager, will have the effect of making the product transfer relatively invisible to Bayer's fipronil customer base.

Finally, Bayer, who had considerable say in the terms of the FTC settlement, decided to abandon fipronil and retain imidacloprid, another recently-developed active ingredient. The decision was surprising to some, since the patents on fipronil extend four years further out than those for imidacloprid. Bayer, however, sees imidacloprid as the top pesticide in the world when all market segments are considered, and sees greater profit potential in imidacloprid than fipronil.

Read the fipronil MSDS (Termidor®)
Read the imidacloprid MSDS (Gaucho 600®)

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## *"Control" or "Management?"*

*[Lifted almost word-for-word from Pest Control Technology, vol. 30, no. 7, July 2002, p. 36, "M-Word Mania," by Albert Greene]*

For most purposes, the U.S. General Services Administration (GSA) IPM program prefers to describe the services it delivers as "pest control," simply because the average client is a lot more familiar and comfortable with that expression than "IPM."

There's been a rush during the past few years to transform "control" into the far more sophisticated, formidable, and politically correct "management." Not only has it been difficult adjusting to the National Pest Control Association's new acronym (NPMA), but the label of choice for the industry's frontline employees has been shifting uncomfortably for decades. "Exterminators" became "pest control operators," then "pest control technicians," who now are called "pest management professionals." [*In DoD, the latter name is used for entomologists and applied biologists, not for technicians – Ed.*]

Obviously, labels send messages. The use of "management" conveys a recognition that safe, effective and economical pest suppression isn't just a matter of spraying some bug juice. Particularly in a sensitive environment such as a school, it indicates that this service often presents a complex, multidimensional challenge requiring the coordination of a broad array of technological, legal and cultural elements.

On the other hand, there's nothing inherently wrong with the word "control." It's used for such grave affairs as "arms control," birth control," and "air traffic control," none of which are considered particularly lightweight issues. Not to mention control rooms, control boards, mission control … you get the idea.

I think everyone should lighten up and temper this M-word obsession with some common sense. The term "Integrated Pest Management" is here to stay as a symbolic expression of environmental awareness – and that's fine. But there's no reason why not to use the term "pest control" if that's the subject you're discussing.

Take a stand. Go retro. Use "control" proudly in your conversation today!

[*Dr. Greene is GSA's national point of contact for IPM issues. Reach him at* agreene@pctonline.com]

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## *School Environmental Protection Act not Passed into Law*

*[Pest Control Technology, vol 30, no. 6, June 2002, p. 14]*

The School Environmental Protection bill is a federal proposal to regulate the use of pesticides in schools, with the stated intention of reducing risk to students and staff. Late last year, the bill was not included (as planned) in the final version of H.R. 1, the Better Education for All Students and Teachers Act. A second unsuccessful attempt was made to include the language of the bill in the final version of the farm bill that was signed by President George W. Bush in May of this year. As of this writing, SEPA (as it is called incorrectly, since it is not even a bill and does not become an act until it is passed into law) is not law. The surprise in this case is that SEPA is supported whole-heartedly by the pest control industry, who would rather deal with one set of federal regulations than with 50 separate state regulations. While all states are required by EPA to have regulations governing pesticide use in general, the fact is that most states have no regulations that apply specifically to schools. Pennsylvania passed some school-pesticide legislation recently, and there is some interest in Utah, but most states are only in the discussion phase of the issue, if at all.

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## *New Tick Control Device Marketed in Northeast*

*[Pest Control Technology, vol 30, no 6, p. 17]*

The MaxForce® Tick Management System was launched in May in New Jersey and Connecticut as an alternative to area treatment for tick control in the management of Lyme Disease. Aventis Environmental Science cooperated with the Centers for Disease Control and Prevention to develop the self-applicating device that treats mice, chipmunks and other small rodents with fipronil to kill the larval and nymphal *Ixodes* ticks that feed on them. The device, which looks like a rodent bait station, is designed to be placed around the perimeter of an area where tick control is desired. For the manufacturer's web site for this product, click here.

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# *From the Engine Room*

*[EN2 Jeffrey Cash, NDVECC Bangor]*

For those of you facing deployment, or for any field exercise, here are some tips to keep your pesticide dispersal or other equipment running trouble-free:

- When trouble shooting equipment that is not functioning properly, always refer to the manual or technical guide for that piece of equipment.
- Start with the easiest task first, and work up to the more difficult trouble-shooting task.
- Keep in mind the four "golden rules" when troubleshooting:

    a. Always refer to the owner's manual or technical guide for the particular piece of equipment being worked on;
    b. Do not reinvent the wheel;
    c. If you don't know, don't be afraid to say so;
    d. If it isn't broken don't fix it.

- Basic troubleshooting.

    a. Check all fluid levels, especially oil and fuel.
    b. Filters are another trouble area. If the filters should become dirty, the best thing to do is to replace them. If you don't have a replacement for the specific filter, some air filters can be cleaned. For example, sponge-type filters can be cleaned using mild soap and water, but the filter *must be rinsed well and must be thoroughly dry before reinstalling.*
    c. In desert conditions, sand will often be the number one reason for equipment failure. To minimize sand-related problems and prevent such contaminants from getting in your equipment, proper storage of equipment must be followed at all times. Stow the equipment indoors whenever possible. If your equipment must be outside, cover it with several plastic bags, *paying close attention to intake filter housing and exhaust ports*. Wipe down equipment carefully and thoroughly before and after use to eliminate sand build up.

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# *Maintaining Your Category 8 Certification in the Navy*

*[Dr. W. Tozer, DVECC Bangor]*

At the Navy DVECC's, we are frequently asked, "What do I do if my DoD Pesticide Applicator Certification in Core & Category 8 – Public Health has expired?" You may believe that anybody can be recertified during the annual NEHC Preventive Medicine Workshop, but this is not the case. Only somebody holding a current, valid certification is eligible to attend a recertification training program (DoD Pest Management Recertification, CIN B-322-1074, for the Navy's Category 8 class.) Under new guidelines from the Armed Forces Pest Management Board, your certifying official may extend your certification for up to one year from the original expiration date. (In the past, the maximum extension was six months.) *This is not an automatic process.* You must request such an extension, by email or letter, from your certifying official.

Once your certification has expired fully, you must attend and successfully complete an initial certification course of instruction. For the Navy Preventive Medicine Technician, this means attending one of the following three courses:

1) **Medical Entomology and Pest Management Technology for Preventive Medicine Technicians** (CIN: B-322-0017) This is the 4-week course offered three times a year by NDVECC, Bangor at PMT School, NSHS, San Diego. Individual quota requests must be addressed to the Education & Training Department at NDVECC, Bangor. There are usually seats available, and the course is not cancelled due to operational commitments.

2) **DoD Pesticide Applicator Certification** courses**.** This 3-1/2-week sequential series, offered in March and September each year, consists of three separate courses, "Core: Pest Management Technology Basic (CIN: B-322-1070)," "Plant Pest and Vegetation Management" (CIN: B-322-1071), and "Arthropod and Vertebrate Pest Management" (CIN: B-322-1072). All PMT's need the first and third courses. The middle course, which occupies four days of the second week, addresses categories that the PMT rarely deals with.

3) **Medical Entomology and Pest Management Technology (Reserve),** intended as a 2-week survey course for Reserve personnel on ACDUTRA, but which has also been modified to meet minimum requirements for Core and Category 8 certification. Course enrollment for non-reservists is limited to PMTs who have previously been certified and whose certification is currently expired. This course is offered three times per year (in February, June, and July) and upon request.

**RECERTIFICATION.** For those whose certification has not elapsed, the course, "DoD Pest Management Recertification," is routinely offered 3-4 times a year by NDVECC Bangor, WA, NDVECC, Jacksonville, FL and through special arrangements with Naval Facilities Engineering activities, the U.S. Army or the U.S. Air Force.

**COURSE ANNONCEMENTS**. Course Catalogs, including class schedules and/or sign-up procedures, POCs, etc. are available though the following sources:

1) CANTRAC Website: https://www.cnet.navy.mil/netpdtc/cantrac/

2) NEHC, Norfolk, VA Website: http://www-nehc.med.navy.mil/

3) NDVECC, Bangor, WA Website: http://www.ndvecc.navy.mil/. A "Microsoft Word" template is provided on the NDVECC website for requesting quotas.

4) NDVECC, Jacksonville, FL Website: http://dvecc-jax.med.navy.mil/Main.htm

5) Armed Forces Pest Management Board (AFPMB)Website: http://www.afpmb.org or http://www.afpmb.org/pubs/courses/courses.htm.

The staff at NDVECC, Bangor, WA and NDVECC, Jacksonville, FL are always ready to assist you in any way we can. We welcome the opportunity to ensure your enrollment and attendance at our courses is as easy and enjoyable as possible.

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# *Diversions*

***Fear Factor Fun***

## *Fear Factor Fun*

*[Thanks to Pest Control Technology for pointing us to this web site]*

Fear Factor, the popular television program that pits contestants against their own worst fears, is not afraid to offer the worst of the world of pests. Check out these links for some of their entertaining entomophobic enterprises…

The Fear Factor coffin!!!

The Rat Hat

Eating (BIG) cockroaches

A Headful of Tarantulas

Bobbing in Waxworms

The Worm Pit

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## *Link World*

Bioterrorism resources from the National Academy of Science - Links to web-based information on bioterrorism

Fish and Wildlife Service public domain image library – Download that perfect photo without worrying about violating copyright laws

Viral genomes for more than 900 viruses -

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